

REMARKS/ARGUMENTS

In response to the Office Action mailed December 20, 2005, Applicants amend their application and request continued examination. In this Amendment no claims are newly cancelled and claim 19 is added so that claims 2-19 are now pending.

Claims 10-13 have been allowed. There is no further comment on those claims.

In this Amendment each of the previously rejected independent claims, claims 7 and 9, is amended. The typographical error in claim 9 is corrected.

Claims 2-8 were rejected as failing to meet the written description requirement of 35 USC 112, first paragraph. This rejection is respectfully traversed.

As best understood, it is the Examiner's position that the patent application, with respect to the method of claim 7, does not describe an X-ray absorber that is laminated, i.e., that includes at least two layers. In making the rejection, the Examiner directed attention to Figure 13. However, the Examiner's attention is directed to the patent application at pages 11-16 which extensively describe the formation of an X-ray mask including a laminated X-ray absorber structure. Particular emphasis in responding to the rejection is given to the passages from page 11, line 29 through page 13, line 7, and page 16, lines 19-25. These emphasized passages are only exemplary and, in fact, attention is directed to the disclosure through page 19 as providing support for and written description of the invention defined by claims 2-8. Upon reconsideration, the rejection should be withdrawn.

In this Amendment, claim 7 is amended to describe further the method of making an X-ray mask. The method is described as resulting in an X-ray mask having an X-ray absorber with particular phase shift and transmission characteristics for X-rays having particular spectral characteristics. This description is supported in the patent application by a similar description appearing in allowed claims 11 and 12, in the description of Figures 2 and 3, and in the specification from page 14, line 10 through page 17, line 3, for example. A mask prepared according to the method of claim 7 permits transfer of a pattern to a resist film with very high resolution in an X-ray exposure process.

Claim 9 is amended for clarity in this Amendment. Amended claim 9 makes clear that the two X-ray absorption portions are stacked on each other, serially, with respect to the X-ray transmitter. This claim amendment is supported by the description in the application at pages 27 and 28 with respect to Figures 14 and 15. Both of those figures depict serially arranged first and second X-ray absorbers 120 and 130 on an X-ray transmitter 100. The second X-ray absorbers 130 are narrower than the first X-ray absorber 120 in the embodiment of Figure 14 and wider in the embodiment of Figure 15.

Both of independent claims 7 and 9 were rejected as anticipated by Miyake et al. (JP 9-43829, hereinafter Miyake). Applicants' representative prefers to consider the English language equivalent of Miyake previously cited to the Examiner, U.S. Patent 5,770,335 in understanding the content of Miyake. This rejection is respectfully traversed as to the claims now presented.

With respect to amended claim 7, it is apparent, through the allowance of claims 10 and 11, that the Examiner has already acknowledged that Miyake does not describe and thereby anticipate amended claim 7 and its dependent claims 2-6 and 8. In the X-ray mask described by Miyake, the phase shift of X-rays that are transmitted by the X-ray absorber and the recessed portion of the X-ray mask is π when the exposure wavelength of the X-rays is 1 nm. As to this point, attention is directed to paragraphs [0021] and [0030] of Miyake. The corresponding passage in the U.S. patent to Miyake is at column 4, lines 21-39 and column 6, lines 1-14. The invention as defined by amended claim 17 and its dependent claims is clearly outside the disclosure of Miyake and those claims cannot be anticipated by Miyake.

The rejection of independent claim 9, based upon Figure 2 of Miyake, is erroneous for several reasons. The most important reason is that the elements 2 and 3 of Miyake that the Examiner relied upon as corresponding to first and second X-ray absorber portions of claim 9 are not stacked on each other, i.e., are not serially arranged, with respect to the X-ray transmitter 1 in Figure 2 of Miyake as in the structure of claim 9. Rather, the phase shifters 3 are located beside the X-ray absorbers 2 on the transmitter 1. Moreover, not only are these elements not stacked on each other as in the structure of claim 9, Figure 2 of Miyake does not include two X-ray absorbers. There are X-ray

absorbers and phase shifters apparently made of different materials, but not two X-ray absorbers. Since anticipation requires that a prior art publication disclose every element of a claimed invention, Miyake's Figure 2 cannot begin to match the limitations of claim 9. The rejection of claims 9 and 10 must now be withdrawn.

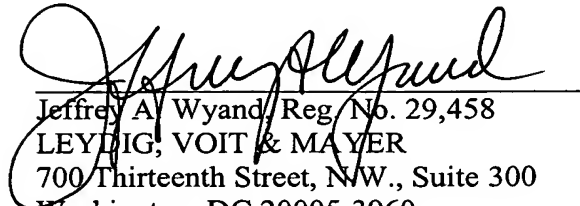
Claims 2 and 14 were rejected as unpatentable over Miyake in view of Lee et al. (U.S. Patent 6,534,221, hereinafter Lee). Claims 3 and 15 were rejected as unpatentable over Miyake in view of Maehara et al. (U.S. Patent 5,870,448, hereinafter Maehara). Claims 4 and 16 were rejected as unpatentable over Miyake in view of Sentoku et al. (U.S. Patent 5,553,110, hereinafter Sentoku). Further, claim 8 was rejected as unpatentable over Miyake in view of Zapka et al. (U.S. Patent 4,855,197, hereinafter Zapka).

All of these rejections are respectfully traversed because each rejection is founded upon the assertion that Miyake anticipates either claim 7 or claim 9. Neither rejection can be maintained because the claim 7 and 9 that are presented here cannot be anticipated by Miyake for the reasons already supplied.

With regard to the rejection of claim 8, Zapka is an irrelevant reference that only concerns doping of a layer before etching recesses in the layer. There is nothing selective concerning the implantation step described by Zapka. In the invention as defined by claim 8, ions are selectively implanted in certain areas of the X-ray transmitter before the etching step used to form the recesses. The selective implantation changes the etching characteristics of the transmitter assisting in formation of the recesses. See the patent application at page 27, lines 14-19 describing an increase in the local etching rate where ions have been implanted. The absence of any relevant disclosure in Zapka shows that claim 8, independent of the patentability of claim 7, is patentable over the prior art applied.

Reconsideration and allowance of all of the claims now pending are earnestly solicited.

Respectfully submitted,


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